

National 5

Homework EF12

1. (a) Express $x^2 + 6x + 11$ in the form $x + a^2 + b$.

(b) Express $x^2 - 8x + 19$ in the form $x - a^2 + b$.

(c) Express $x^2 + 4x + 3$ in the form $x + a^2 + b$.

(d) Express $x^2 - 10x + 39$ in the form $x - a^2 + b$.

2. Solve each of these equations:

(a) $3(x+1) + 2(x+3) = 19$

(b) $4x - (x-1) = 19 - 3x$

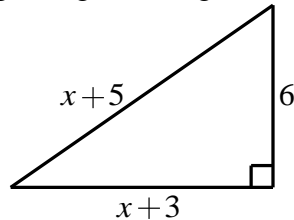
3. Simplify each of these expressions:

(a) $(a+2)^2 + (a-2)^2$

(b) $x^2 + 7x + 9 - x(x+2)$

(c) $(4x)^2 - (3x)^2$

4. Find the value of x in the right-angled triangle sketched below.



5. Multiply out and simplify:

(a) $2x - 3^2$

(b) $3x - 1 \quad x - 3 \quad -2x \quad 2x - 3$

(c) $2x + 3^2 - x - 3^2$

(d) $x + 3 \quad x^2 + 2x + 3$

6. Solve each of these inequalities.

(a) $3x - 5 \leq 36$

(b) $5x - 1 > 2x + 14$

(c) $10 - x \geq 2x + 4$

7. (a) Expand and simplify $x + 1^2$

(b) By writing $x + 1^3 = x + 1 \quad x + 1^2$, expand and simplify $x + 1^3$.

8. Simplify

(a) $\sqrt{18} + 5\sqrt{2}$

(b) $\sqrt{5} \left(2\sqrt{5} - \frac{1}{\sqrt{5}} \right)$

(c) $\sqrt{3} - 1 \quad \sqrt{3} + 1$

9. Simplify each of the following.

- (a) $(\sqrt{5} - \sqrt{2})^2$ (b) $\sqrt{7}(\sqrt{7} + \sqrt{2})$ (c) $(6 - \sqrt{2})(6 + \sqrt{2})$
 (d) $(1 + \sqrt{2})^2$ (e) $\sqrt{50} + \sqrt{98} + \sqrt{72} - \sqrt{32} + \sqrt{8}$ (f) $(\sqrt{2})^3$
 (g) $(2\sqrt{3})^4$ (h) $\sqrt{125} + \sqrt{45} - \sqrt{20} - \sqrt{80}$ (i) $(\sqrt{3} + \sqrt{2})^2$

10. An extract from a camping holiday brochure is shown below.

Season	For 14 nights					Over 14 nights
	Two adults	Each extra adult	Each young adult aged 14 to 17	Each child aged 10 to 13	Each child aged 0 to 9	Each extra night per family
low	£399	£74	£40	Free	Free	£19
mid	£555	£85	£50	Free	Free	£29
high	£699	£95	£60	£46	Free	£39

- (a) Find the cost of a holiday for 2 adults and a child aged 8, for 17 nights during mid-season.
 (b) Write down a formula to find the cost £ C , of a holiday in mid-season for 2 adults and a child aged 8 lasting t nights, where $t > 14$.

11. Evaluate each of the following.

- (a) 2^5 (b) 3^{-2} (c) $9^{\frac{1}{2}}$ (d) 3^{-3}
 (e) 5^0 (f) $8^{\frac{2}{3}}$ (g) $9^{\frac{3}{2}}$ (h) 7^{-1}

12. Simplify each of the following.

- (a) $a^4 \times a^{-3} \times a^{-1}$ (b) $(x^{\frac{1}{2}})^6$ (c) $\frac{y^3 \times y^{-2}}{y^{-3}}$ (d) $(g^{-2})^{-4}$
 (e) $(p^2 q^4)^{\frac{1}{2}}$ (f) $2c^2 \times 3c^{-3}$ (g) $10^{\frac{1}{2}} \times 10^{-\frac{2}{3}} \times 10^{\frac{1}{6}}$